What is claimed is:

1. In an injection molding machine, a heater comprising,

a) a thermally conductive substrate surface;

b) a silk-screened dielectric layer applied on said substrate surface;

c) a resistive layer applied on said dielectric layer thereby forming a circuit for the generation of heat;

d) at least a pair of silk-screened contact pads applied in electrical communication with said resistive layer for electrical connection to a power source;

e) an insulation layer applied over said resistive layer; and

f) a connector housing for mechanical connection of a contact to each said contact pad, thereby eliminating the need for soldering, brazing or other phase altering connection means.

2. The heater of claim 1, where said substrate is a non-flat surface.

3. The heater of claim 2, where said non-flat surface is cylindrical.

4. The heater of claim 1, where said substrate further comprises a longitudinal slot running the entire length of said substrate.

Sub a97

5. ~~The heater of claim 1, where said resistive layer~~ further comprises a resistive trace and a low-resistance conductive trace, thereby forming an optimized heat generating pattern.

Sub B7

6. The heater of claim 5, where said resistive trace is silk-screened on said dielectric layer.

7. The heater of claim 5, where said conductive trace is silk-screened on said dielectric layer.

8. The heater of claim 1, where said resistive layer is silk-screened on to said dielectric layer.

9. The heater of claim 1, where said resistive layer is direct printed on to said dielectric layer.

~~10. The heater of claim 1, where said connector~~ housing further comprises a locking detent that engages a locating hole on said substrate.

Sub A10

11. The heater of claim 10, where said locking detent is selectably removable from said locating hole.

12. The heater of claim 10, where said detent and said locating hole are in a predetermined arrangement relative to said contacts, thereby ensuring electrical communication of said contacts to said contact pads when said detent engages said hole.

~~13. The heater of claim 1, where said connector~~ housing further comprises a key for slidably

Sub A11

engaging a longitudinal slot in said substrate, thereby aligning radially said contacts with said contact pads.

14. The heater of claim 1, where said connector housing is made from a ceramic material.

Subart

15. The heater of claim 1, where said substrate is a nozzle body.

16. The heater of claim 1, where said substrate is made from steel.

17. The heater of claim 1, where said dielectric layer has a dielectric strength between 1000 VAC to 1500 VAC and an insulation resistance of at least 100 mega-ohms.

18. The heater of claim 1, where said substrate and said dielectric layer and said resistive layer and said insulation layer have substantially the same coefficient of thermal expansion.

19. The heater of claim 18, where said substrate has a slightly lower coefficient of thermal expansion than said dielectric, resistive and insulation layer.

20. The heater of claim 1, where said resistive layer is applied to said dielectric layer by photoforming.

21. The heater of claim 1, where said resistive layer is formed by laser or abrasive etching.

22. ~~The heater of claim 1, where said contact is made from gold plated steel.~~

Saba27

23. The method of heating comprising the steps of:

a) silk-screen printing a thick-film dielectric layer on a thermally conductive substrate;

b) printing a thick-film resistive layer on said substrate forming an electrical trace for generating heat through ohmic losses;

c) silk-screen printing at least a pair of contact pads in electrical communication with said resistive layer;

d) silk-screen printing an insulation layer over said resistive layer;

e) engaging an electrical contact on each said contact pad using an annular connector housing;

f) electrically powering said electrical contacts.

24. The method of claim 23, where said substrate is a cylindrical surface.

25. The method of claim 24, where said substrate further comprises a longitudinal slot running the entire length of said substrate.

26. The method of claim 23, where said substrate, dielectric layer, resistive layer and insulation

layer have substantially equal coefficients of thermal expansion.

27. The method of claim 24, where said substrate, dielectric layer, resistive layer and insulation layer have substantially equal coefficients of thermal expansion.

28. An injection mold runner nozzle having a coaxially disposed cylindrical heater comprising:

a) a cylindrical, thermally conductive substrate with a slot running the entire length of said substrate, said substrate having a smaller coefficient of thermal expansion than said nozzle, thereby causing said substrate to further clamp onto said nozzle as said nozzle and said substrate heat up;

b) a silk-screened dielectric layer applied on said substrate;

c) a resistive layer applied on said dielectric layer thereby forming an electrical circuit for heat generation;

d) at least a pair of silk-screened contact pads applied in electrical communication with said resistive layer for electrical connection to a power source;

e) an insulation layer applied over said resistive layer; and

f) an annular connector housing that slidably engages said substrate for mechanical connection of a contact to each said contact pad.